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Wood Turning and the Lathe

By L. L. THWING

If you will look around the room in which you happen to be sitting, you will note that practically all the furniture is a combination of flat and curved surfaces. The flat surfaces have been shaped with a saw and finished with a plane. The curved surfaces have been produced by a variety of tools, some by hand carving and some by molding planes, fret saws and chisels. Give a cabinet maker an assortment of the above tools, and he can produce about any form of surface required for any kind of furniture, with the exception of bed posts and similar work. Work of this kind is called "turned work," and the machine that produces it is called a lathe.

It is usually a device of some size, as compared with hand tools, and for that reason few collectors have the space for a collection of lathes. Mr. W. B. Sprague has at least one. In general, the industrial museums are the only places where you can see collections of lathes. Lathes, as a group, are probably the most fundamentally important machines we have. Without them, we would be unable to produce the many shafts, pistons, and other cylindrical parts, that are a necessity in practically all other machines. A lathe is a machine tool, and a machine tool is a machine used to make all other kinds of machinery, — hence a very important mechanical device.

The first rotating machine, of which we have any record, is the potter's wheel which has been known for at least five thousand years, and the lathe is popularly supposed to have developed from this ancient device. This, however, is doubtful. What tangible evidence there is points to the strap drill as the father of the lathe (See *Technology Review*, January, 1933) and it was probably a Greek invention of not much earlier than 500 B.C. Talus and Daedalus are variously credited with this invention by early classical writers. The first definite proof of its use that we have, however, is an Egyptian wall painting of about 300 B.C. This was during the period of Greek influence in Egypt. This type of lathe continued to be used in Egypt and surrounding countries until very recently. It is still used in India.

These crude lathes consist of two wooden posts, sharpened at one end, and flat on the other. A stout iron rod with a conical end is driven into each post, a few inches from the flat end. If a Greek artisan wished to turn a bed post of the sort mentioned in the Odyssey, he drove the posts into the ground, just far enough apart to hold the piece to be turned between the two pieces of iron (centers). This distance was maintained by one or more strips of wood nailed between the two posts, one of which was used for a

(*Continued on page 2, column 2*)

Our Purpose

The purpose of the association is to encourage the study and better understanding of early American industry, in the home, in the shop, on the farm, and on the sea, and especially to discover, identify, classify, preserve and exhibit obsolete tools, implements, utensils, instruments, vehicles, appliances and mechanical devices used by American craftsmen, farmers, housewives, mariners, professional men and other workers.

Dues

The annual dues are one dollar, payable September first, for the year immediately ensuing. *The Chronicle* for the current year is sent to all members without additional charge. Back numbers may be secured from the Treasurer for 20c each. For further information, address any of the officers. See page 5.

Hair Tongs

By LAWRENCE B. ROMAINE

"June ye 1 st 1772. Making pear hair tongs for Margaret Keith —my iron 1s. 3p.
Sept. ye 5 th 1773. To mending your chain, your Father's chain, your pitchfork and hair tongs for your Mother 7 sh. 3p.
January, 2, 1774. To making curling tongs for Mary with your iron. 9 p."

It is a great pity that these old ledgers are not more specific. They almost never give any description of the articles, so that it is hard to visualize the workmanship and compare it with the cost. They are prone to listing groups of work or articles, as above, which makes it impossible to draw any conclusions, except that such work was done at that particular time. I have many interesting old ledgers and many more interesting pieces of dated and signed iron, but my dream is of finding a two-foot initialled latch with the blacksmith's accounts tied to it!

There were few more delicate utensils made on the anvil than these "hair tongs," or curling irons, as they are called in common parlance today. Their manufacture required great care and gave the smith an opportunity for originality of design. The small collection here pictured, I believe to be American made. They have come from Virginia, New Jersey, New York, Connecticut, Vermont and Massachusetts. I have no doubt that more ornate specimens were produced in Europe, probably dating before these. Collectors of German, French, Spanish and Italian workmanship may scoff at this crude American exhibit. The fact remains, however, that these gadgets from the forges of pioneer apprentices and neophyte blacksmiths, are interesting because of their relation to the domestic development of the feminine mind.

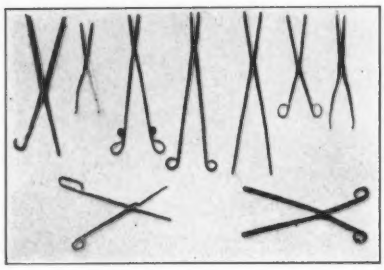
Most women are familiar with the

modern electric curling iron. Before the advent of these brilliantly clean examples of human ingenuity and progress, women used the now "old fashioned" curlers, nickel-plated with wooden handles. These were held over gas ranges, coal ranges, gas jets, alcohol lamps and sterno cans. In many rural sections of the country, they are still in use. This type, in varying stages of perfection, have been known for over a hundred years. In the eighteen-forties and -fifties, several fluid and whale oil lamps were manufactured, equipped to hold the irons so that the flame heated the ends. Just when these machine-made irons were first produced, I can not say. I do not believe that they were made in the United States before 1830, although they may have been imported before that date.

To know when women first curled their hair would require far more research. Suffice it to say that the crude, wrought iron examples here pictured were probably used and made from our earliest settlement to the eighteen-twenties. The salesman of today is convinced that the women are the nation's "buyers." There is no way of checking up on the date when this first became true. I doubt that the women of days gone by "ran things" as they do today. I also doubt that the sturdy pioneers and "masters of their homes" purchased "hair tongs." The canny smith must have counted on this when he created a utensil easy to handle, delicate, and attractive.

If you have ever tried to "draw" iron on an anvil or watched a good blacksmith at work, you can imagine the finesse required to curl the "business ends" of a pair of curling irons, let alone tapering the handles into ram's horns or butterfly antennae. They were undoubtedly used for fluting as well. Few of the utensils of the early period had but one use. Material and time were two very important factors, and domestic articles had several duties to perform, in most cases.

The irons varied in length from 16 inches to 8½ inches. The "curling capacity" ranged from 6½ inches to a mere "2½ inch curl." I imagine that these measurements were limited by ruffles and laces, more than by the length of hair in vogue at the moment. It is also interesting to note the two types. In most of the specimens, one side is round and the other has a groove, so that, by pressing the two parts together, either a curl or a ruffle is produced. A few of the irons have



HAIR TONGS

two round legs, and the work must be done by closing the iron and then twisting and turning it.

For such a minor detail as "curling irons," I fear I have taken too much space and reading time already. The irons in the picture must speak for themselves. The "left, bottom row" has the butterfly antennae knob tips I spoke of. The curls and the ram's horns are easily picked out. The others have etching, where the pin holds the tongs together. They are all crude, but at the same time have a great delicacy and speak for the "touch" of the old-time blacksmith.

Wood Turning

(*Continued from page* 1, *column* 2)

tool rest. The piece to be turned had been roughly rounded, before being put into the lathe. Now a stout cord or leather thong was wrapped once or twice around it, and the apprentice took an end in either hand. By pulling alternately, first with one hand and then with the other, he rotated the work, first in one direction and then in the other. While the top of the work was moving towards him, the turner thrust his tool against the wood. As soon as the direction of rotation changed, he withdrew the tool. Thus, alternately advancing and retracting the chisel, the work progressed until completed. As the work revolved only a few turns in the right direction, the turner had to be prompt to advance the tool just at the right time, and just as quick to withdraw it, when the work began to turn in the opposite direction. This is the kind of lathe that was used for a thousand years without improvement.

As time went on, the lathe itself acquired a frame and movable head and foot-stocks, or "poppets," but the in-and-out motion of the tool and the lack of a continuous one-way rotation of the work persisted generally until well into the 19th century. For light work, such as the watchmaker's, the string of a bow was wrapped around the work, strung to the bow, and sawed back and forth with one hand, while the watchmaker applied the cutting tool to the diminutive steel shafts of a watch.

A variant of the first Egyptian lathe is still used by the Kentucky mountaineers. The writer has corresponded with a man who has seen it used within the past ten years. If a new bed is to be made, the wood-turner is summoned, and appears with only his turning tools and a few other accessories. The lathe itself is made "on the job." The turner selects two trees, about four inches in diameter, and a suitable distance apart for the length of the work to be turned. A center is driven into each tree, and one of them is sprung back to insert the work. The natural elasticity of the tree holds the work firmly between the centers. A tool rest is nailed between the two trees, and the work progresses as it did in Egypt two thousand years ago.

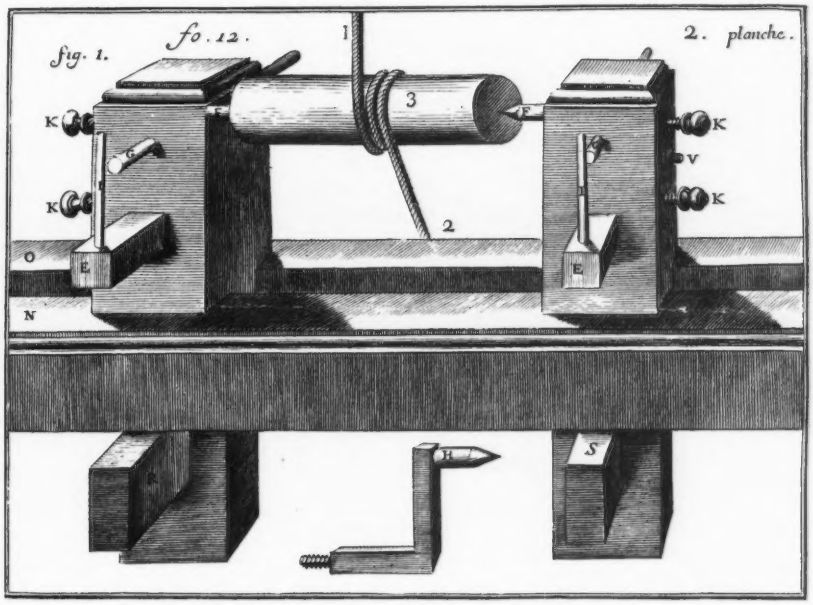
From 300 B.C. to 1500 A.D., there are no real pictures of lathes showing any detail of their construction. There is a conventionalized lathe on the tombstone of a Roman wood-turner, and sundry similar hints may be picked up here and there during the Dark Ages. Turned work is mentioned by several Latin authors, and Theophilus, who wrote about 1100 A.D., mentions the lathe, but gives no details of its construction. Certain 15th century manuscripts show details of lathe-like devices, and the great Leonardo da Vinci sketched a lathe, with the now familiar balance-wheel and foot-treadle, but not until Jaques Besson published his *Theatrum Machinorum* in 1578, do we learn just what a 16th century lathe looked like. This type of lathe persisted in use well into the 19th century, even in the most advanced countries.

The common 16th, 17th and 18th century wood-turner's lathe had a frame or bed consisting of two heavy parallel beams supported by sturdy legs. Often the left-hand leg projected above the bed, and was continued to make one of the poppet heads, in which one of the two centers was driven. The other head could be adjusted along the bed, to accommodate work of different lengths. It carried a downward projecting tenon, long enough to pass entirely through the bed, and had a square mortise into which a wedge could be driven against the lower face

of the bed, to hold this movable poppet head firmly in place. Sometimes there was a separate adjustment of the center itself, so that it could be set up tightly into the work, without loosening the poppet head. The driving mechanism was something new,—just how new we do not know. It consisted of a treadle hinged to the floor at one end, with a cord attached to the free end. This cord passed upward around the work and to the free end of a long stiff pole, attached near the ceiling. The spring of this pole was great enough to lift easily both the treadle and the turner's foot. In use, the turner thrust his foot down hard on the treadle, and at the same time applied his tool to the work. He then released the pressure, and the spring pole lifted both the treadle and his foot. During this time, the tool was drawn back from contact with the work, as the latter would be turning in the wrong direction. This undesirable feature of the lathe had not yet been improved.

The cycle of operations was: thrust down with your foot; thrust in with the tool; let go with your foot; pull back the tool. This is not as difficult as it seems. Several years ago, the writer built such a lathe, with only such tools as are commonly found in a farm workshop, and had no great difficulty in acquiring the rhythm of operation. Hard wood, such as beech and maple, can be turned satisfactorily, but soft wood, like pine, tears badly, as the speed of rotation is not high enough. It is a rule of all turning: the softer the material, the faster the required speed.

This type of lathe, the pole lathe, was the most popular until a hundred years ago. Lathes with continuous rotation in the same direction were not unknown, however. We know that they were in use in 1700, and possibly for many years before that. Such lathes were driven by man power from a "great wheel." This is illustrated in Mercer's *Old Carpenter's Tools* and in THE CHRONICLE, Vol. I., No. 3, page 4. This was simply a large wheel with two handles. One or two men were required to turn it. It was connected to the lathe by a driving cord, in which case it was necessary to attach a small pulley to the work, so that the cord would not slip. But, even at a time when labor was cheap, and apprentice work practically free, the cost of man-power was something to be considered. For that reason, the "great wheel" was probably not used nearly as much as the pole lathe, which was a one-man machine.



THE POLE LATHE (*from Plumier*)

A and B.—The poppets, or puppet heads; F and H.—The centers; N-O.—The lathe bed, or shears; R and S.—Wedges to hold the poppets in place; EE, GG and II.—Supports for tool rest (latter not shown). These are adjusted so that the rest is close to the work (3), and held in place by the screws KKKK; 1 and 2.—The driving cord (foot-treadle and spring pole not shown).

The lathe sketched on page 2, No. 4 of THE CHRONICLE, is as Mr. Wolcott states, an early 19th century machine. It has all the essential parts of a modern turning-lathe. All improvements made since that time have been details, rather than changes in the machine as a whole. This lathe, it will be noted, has a headstock, carrying two bearings and a pulley. The pole lathe had no revolving parts at all. The work revolved on the fixed iron centers, called "dead" centers. The end of the rotary spindle on Mr. Wolcott's lathe carried a driving center, somewhat like the end of a large screwdriver, with a point at the center. The work was driven on to this, the tailstock center screwed into the other end (well oiled), the belt connected from the great wheel to the driving pulley of the lathe, and all was ready for turning wagon-wheel hubs.

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"Busk" is defined by Edward Knight's Dictionary as "a stiffening bone or plate in a corset, to maintain its shape and prevent its gathering in folds and wrinkles around the waist." The early hand-made ones are usually carved with hearts and other sentimental symbols, and sometimes with initials and dates. They were evidently considered as appropriate for enamoured swains to bestow upon the objects of their affections.

Wigs were curled by rolling up the hair, and fastening it, "upon little cylindrical instruments, either of wood or earthenware, called pipes," and then boiled and baked.—*Rivington's Trades*, 1827.

The Tanner and the Currier

By William B. Sprague

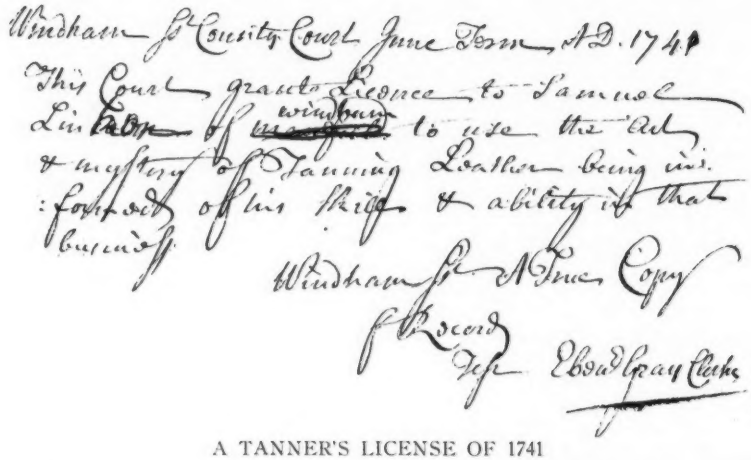
(Author's Note — The capital letters interspersed through the text refer to the list of authorities at the end of the article, the page number being given as well, when thought necessary. The expression "No Fig." means that we have been unable to find a specimen of the article in question, from which an illustration could be made.)

The object of converting the skins of animals into leather, by the processes known as *tanning* and *currying*, is to prevent their destruction by putrefaction, to render them tough and durable, impervious to moisture, to a greater or less degree (E), and, for some purposes, soft and pliable (P).

The most primitive method of producing leather was to soak the skins in water, and then to force oil into the pores by hard rubbing, a process mentioned by Homer (P), but Pliny's references to the materials used in treating leather shows that both the tanning and tawing operations were practiced in his time (D2489). The first tannery in New England is said to have been established at Lynn, Mass., in 1629 (A), and, in 1660, the industry was so thriving in New York, that a section of the city was set aside to accommodate it (B). Nevertheless, as late as 1750, Massachusetts farmers did their own tanning (S), and it was not until about 1800, that the process was properly understood, or carried out on the correct principles (F,H,P).

In the trade, the stoutest kinds of hides are known as *butts* and *backs* (G, O). Technically, *hides* are those of mature cattle, while *skins* are taken from calves, goats, sheep, and other smaller animals (F, H, L). The very lightest *skins* are *kips* (I, O).

The bark much preferred for tanning purposes is that of the oak (E, F, N), although, when oak is not available, other kinds may be used, such as alder or willow (N), hemlock, spruce or chestnut (H), birch (C), larch (M), sumach (R) as well as barks from many varieties of foreign trees, which latter, however, are principally for the production of fancy leathers (G). Tanbark should be taken from trees at least thirty years old (F), in the spring when the sap has risen (E, F, G), usually after the timber has been felled (E, G), but occasionally before (F). The tool with which the bark was formerly stripped is still recognized in New England as a *spud* (Fig. 1F), which was also the


Windham ss County Court June Term A.D. 1741
This Court grants Liedence to Samuel Lin[illegible] of Windham to use the Art & mystery of Tanning Leather being inspected off his Work & ability in that business.
Windham ss A True Copy of Record Test Ebd Gray Clerk

A TANNER'S LICENSE OF 1741

Pennsylvania name for it (C), although one authority defines *spud* as a "root-digger" (D2292). Other names were *bill* (F) and *peeling iron* (D231). The bark was first slit longitudinally with an axe or hatchet (D231) or with a *barking mallet* (No Fig.), a short-handled tool, sometimes of hard wood, though preferably of iron, with a face three inches square, and the other end sharpened to a wedge or peen, which could also be used for ringing the tree (D232). The spud is found in many different forms, but is always constructed on the same general lines as the modern tool for opening crates and packing boxes, with chisel-like blade (lacking, of course, the notch for nail-drawing), and bent into a curve to furnish leverage. The slabs of bark, after being stripped off, were stacked in piles, and allowed to dry (M). They were then ground to coarse powder in a mill (F, G, M, N). "If tanning materials are simply broken by a series of clean cuts, only those cells directly on the surfaces of the cuts will be ready to yield their tannin. * * * Hence it is necessary to bruise, break and otherwise sever the walls of all the cells" by grinding (I).

Before proceeding to the tanning process, the hide was soaked in water for two or three days, and given a superficial scraping to free it from dirt and other impurities (E, G). It was then placed in a pit containing a solution of lime and water, and left for two or three weeks, during which period it was drawn out daily, drained and put back (F, H, M, O), — a process called *handling* (G, I). Some tanners, in preference to the lime bath, *sweated* (O) the hide in a smoke-house, heated by a smouldering fire, which caused a slight putrefaction and loosened the flesh and hair (D, K, L), and in the case of sheep skins, permitted the salvage of the wool, which would be adversely affected by the action of the lime (I, R). Others substituted for the lime solution a liquor made by boiling down, in a copper kettle, the ground-up wood, roots and leaves of the tree from which the tanbark was taken (N). The lighter *skins* were usually prepared for tanning by immersing them in a lixivium of dog or poultry dung (E, F, G, H), called a *grainer* (P). This was sometimes called *bating* or *puering* (I).

For removing the hair, the workman used a curved two-handled scraper, called the *unhairing knife* (G, O, Fig. 1C), the blade of which was brought to an edge only on its lower or concave side. The hide or skin was spread on a "cylindrical table" (G, O), a "wooden horse of convex form," (L, P), usually called the *beam* (G, H, I, Fig. 1A). Some of the early beams were of stone (E, J), but the usual material, as in the case of the illustrated example, was lignum vitae. One end of the beam rested on the floor, and the other end, by means of a movable two-legged support was raised to about the level of the *beamsman's* waist. The concave curve of the knife's edge fitted the convex surface of the beam (D2681, G, O), and the workman, by pushing strokes (R), "partially scrapes and partially shaves off the hair and epidermis" (I).

The next step was to clean from the inner side all particles of animal tissue and *net skin*, called *fleshing*. The *fleshing knife* (D2490, F. N, Fig. 1D), in construction similar to the unhairing knife, was two-edged, the concave edge being used for the scraping, and the

(*Continued on page 6, column 1*)

Early American Industries Association

Early American Industries Association

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W. B. Sprague, *Editor.*

Editorial

Now and then we hear an expression of mild surprise, that The Chronicle, the organ of an association primarily interested in *American* industries, should devote so much space to discussion of Old World tools and methods. The answer is obvious. For a complete understanding of how the early Americans worked, and what with, we must depend to some extent, in the absence of authoritative records, which are few, upon the logical assumption that they carried with them, on their emigration to this country, the training, and often the tangible instruments, which had given them their livelihood in their native lands. The soundness of this reasoning has been proved time and again. In Pennsylvania we still find tools which conform, in all respects, to the specifications of the early German works on industry. In Schoharie County, New York, and possibly nowhere else in this country, is it possible to unearth abandoned and ancient implements, bearing all of the characteristics of the Low Countries, and probably in use there even today, by peasants in the remoter sections. The American books of trades, published principally on the eastern seaboard, where most of the English settled, are often largely reprints of English publications. Without doubt, America led in acceptance of improved and more efficient methods of work, particularly manufacture, and the comparative suddenness with which the transition from handicraft to factory production took place, increases the difficulty of ascertaining in authentic detail, exactly how most of the early trades were carried on.

Recently one of our members was showing his collection to an official of the Collins Company, tool manufacturers. The host pointed with pride to a most primitive agricultural implement, procured from North Carolina, the frame of which, following the general lines of a horse cultivator, was largely fashioned from the natural growth of the wood, the only metal part being a narrow, spoon-shaped, iron share. "Yes," said the visitor, "we still make several thousand of those irons a year, for export to South America. They still plough with a forked stick down there, but have found that a metal point is more efficient than a wooden one." Substantially the same comment was made with respect to a small gouge adz, evidently designed for the sole purpose of "digging-out" logs for canoes, troughs, barrels, bowls, etc. He further stated that, not infrequently, his company will receive, from some remote part of the world, a curious instrument, the exact function of which can only be guessed, with an order for a number of duplicates. More often than not, there is strong temptation to "improve" the tool from the standpoint of weight or balance, but this is always sternly resisted, on the assumption that the customer wants what he is accustomed to, except for improvement in the quality of the metal.

New York Meetings

As we go to press, all arrangements have been made for a meeting in November of those of our members who live in the vicinity of New York. If you did not receive a notice of this meeting, and wish to attend future meetings, it is absolutely essential that you notify one of the officers, so that your name may be placed on the special mailing list.

Wool Cards

Wool carding was a typical home industry, not requiring much practice or great skill. After the wool was sheared from the sheep and cleaned, it was necessary to straighten the fibres and lay them parallel to one another, before the spinner could twist them into yarn. James Cutbush, in his "American Artists' Manual" (1814) describes a wool card as "a small oblong board, furnished with a great number of short, crooked wires or hooked teeth, upon which the wool to be wrought is hung by drawing it over them, in a direction contrary to that in which the hooks are bended." They were always used in pairs. One was held by the left hand, face up, on the thigh, the handle away from the body, and a small tuft of wool placed upon the teeth. The other card, grasped in the right hand, face down, with the handle toward the body, was repeatedly dragged over the wool, until it was, according to Cutbush, "completely torn between the teeth, broken and blended." When thoroughly carded, the tuft was lifted off with a deft twist of the upper card, and was then known as a *rovelling* or *roving*. It was desirable to expose the cards to heat, such as came from an open fire, during the process. James Tryon, in "Household Manufacturers in the United States" (1917) states that, toward the end of the 18th century, carding machines were introduced, and according to Katherine Coman's "Industrial History of the United States" (1905), by 1828 a complete woolen factory, with machinery for carding, spinning and weaving, all run by water power, was in full operation in Rhode Island. Factory-made wool cards are very often met with; those made by hand are extremely rare. According to "The Great Industries of the United States" (1873), by J. B. Burr & Hyde, beginning about 1775 various machines were invented for making various parts of these cards, and, within twenty-five or thirty years after that, there were factories which turned out the complete article, dog-power being extensively used. Dr. Henry C. Mercer, in his "Tools of the Nation Maker" (1897), states that the use of hand cards was abandoned (in eastern Pennsylvania) early in the 19th century; nevertheless "The Great Industries of the United States" (supra) credits a contemporaneous factory with an output of as many as two hundred dozen hand cards per day.

The Tanner

(*Continued from page* 4, *column* 3)

convex edge for trimming off such portions of the skin as the workman knew, by experience, would not readily respond to the tanning process (R). Occasionally, fleshing preceded unhairing (E, J), but this was not usually the case (R).

The material was next soaked for some forty-eight hours in a solution of sulphuric acid, in order to distend the pores and render it more susceptible to the action of the tannin. This was known as *raising* (D, F, L). Other solutions were sometimes used for the same purpose (E, G, M).

"The tan yard usually occupies a considerable extent of ground and above it are lofts for drying the tanned leather. The tan-pits, which are formed in the earth, are oblong in shape, from 6 to 8 feet in depth. In forming a tan-pit the whole ground is first excavated, and covered with clay; the boards which form the lining to each pit are first built up into chests, then adjusted in their places, and filled with earth to weight them down; the various pipes for conveying the ooze are next arranged and fixed, and lastly, the spaces between the wooden chests are filled up with clay, and made level with the surface of the ground, producing the appearance of a number of pits, in rows side by side, with narrow spaces between them for the convenience of the workmen." (G). Sometimes, the tanners wore wooden shoes, which were immune to the action of the tannin (R).

The pits were filled with a solution of tannin powder and water, called *ooze* (F, J, H, N), and the material soaked in this for a period varying from three months for light skins to a year and a half for the heaviest hides (F), during which time it was necessary to renew (F, L) and strengthen (E, N) the ooze solution at monthly intervals. Each day the hides and skins were *handled*, — i.e., moved up and down (F, L), — and sometimes taken out, drained and restored to the pit (D2490). This was generally done with long-handled, blunt-pointed hooks (G, I, Fig. 1E), although machinery for the purpose became available at a comparatively early date (D2490). The details of the tanning process varied according to the quality and type of leather desired (F, L, N, P), and special steps were required for the production of Russian leather, morocco,

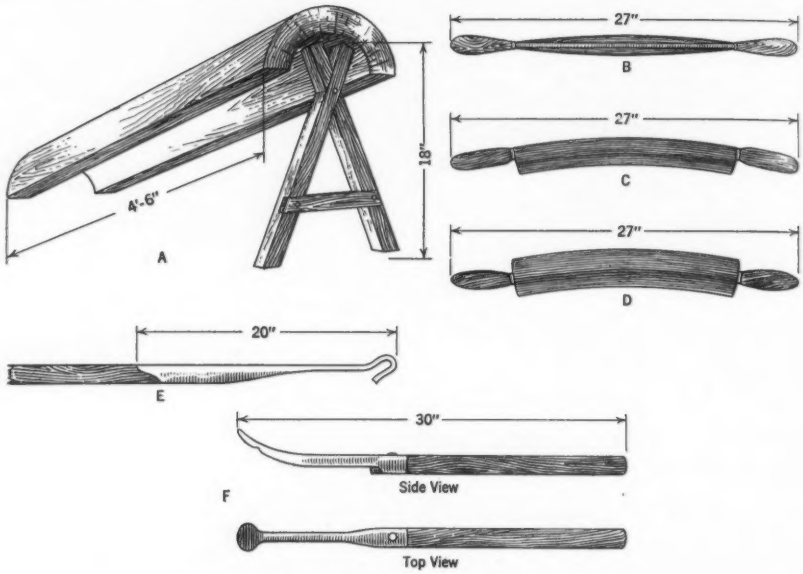

Fig. 1 — TANNER'S TOOLS

A.—Beam, on which the hide was spread to remove the hair and flesh. B.—Pin, for smoothing. C.—Unhairing knife. D.—Fleshing knife. E.—Vat hook. F.—Spud, for stripping tanbark from tree.

chamois, etc. (E, F, G, I, M), but as these involved merely chemical variations, rather than different sets of tools, it is assumed that the reader will wish to be spared the technical details. The most delicate kinds of leather, made from *pelts* (E, P), never went into the tan-pits, but were *tawed* with alum and salt (D2500, E, G, P), to which the yolks of eggs was added, if they were to be finished white (M).

After tanning or tawing, as the case might be, the material was hung up to dry gradually, and then "compressed with a steel instrument (No Fig.) and beaten smooth to render them fine and dense" (F, L), beaten "with a wooden beetle" (E, H, No Fig.) or a wooden hammer, called a *batt* (P, No Fig.) or with a "steel pin" (E, M, No Fig.). and passed between iron rollers (E, H, I, M), or laid flat and pressed with a heavy, movable roller (G, ill.).

Bloom is a white substance, chemically known as ellagic acid, always present in hides and skins, which "has water-proofing qualities, because it fills the leather, at the same time giving weight." (I). To bring this to the surface the leather was laid on a "long cylindrical horse" (O, No Fig.) similar to the beam, except that it was fixed in a horizontal rather than a slanting, position (G, ill.), and then *pinned* (I) or *struck* (G, O), — meaning "smoothed" in this case, — with the *striking knife* (D2429), or *pin* (I), a two-handled steel instrument, with triangular cross section (G, O, Fig. 1B), and finally sometimes ironed with "warm hand-irons" (N).

(*Continued in next issue*)

Warming pans for beds, filled with live coals, are referred to as in common use as late as 1845, by Webster & Parkes *American Family Encyclopedia*, copyrighted in that year. An improved type, new at that time, consisted of a round, tin, canteen-shaped receptacle about ten inches in diameter, with no opening except through a socket projecting from its edge. This was filled with hot water, and the opening plugged by thrusting a three-foot wooden handle into the socket. Local tradition in Bethlehem, Conn., credits this device to a former citizen of that town, known as "Blind" Munson.

Joseph Nathan Kane, a member of the Association, is the author of *More First Facts*, just published by the H. W. Wilson Company. This book is a supplement to *Famous First Facts*. The two volumes, containing over 1,200 pages, record the first happenings, discoveries and inventions in the United States, and contain geographical and chronological indices, as well as an index to events by dates.

Early American Industries Association

New Members

Our total membership is now 610. The following names of new members have been arranged geographically, so as to facilitate bringing membership lists up to date. The Secretary has about forty copies of this list left on hand, and, so long as they last, will send one to each member who applies for it, enclosing three cents in stamps.

CONNECTICUT

Hartford: Rockwell, Franklin P.,88 Fern St.
Norwalk: Jennings, Burgis D., 148 Main St.
Sandy Hook: Jackson, Jerome P.

MASSACHUSETTS

Beverly: Gale, Dr. Howard C., 16 Broadway.
Boston: Hatch, John D., Jr., Fenway Court.
Brockton: Bishop, Arthur J., 180 Thurber Ave.; Wright, Mrs. W. L., 162 Highland St.
Hubbardston: Lufkin Mrs. Charles O.
Mattapoisett: Hill, Frederick.
Peabody: Hill, Miss Ruth, 82 Franklin St.; King, Mrs. Warren B., 240 Lowell St.; Reynolds, Frank, 97 Andover St.
Sudbury Center: Howland, Arthur V.

NEW HAMPSHIRE

Durham: Sullivan, Lynde.
Franklin: Clifton, Mrs. Alyce S.; Clifton, R. G.

NEW JERSEY

East Orange: Bache, Mrs. M. S., 82 Harrison St.; Bonney, Mrs. E. P., 82 Harrison St.
Harrington Park: Curtis, Miss Dorothy.
Moorestown: Boyer, Charles S., 205 East Central Ave.
Plainfield: Palmer, S. Carroll, 321 West Front St.
Tenafly: Oehlschlager, Mrs. P. A., 91 Summit Lane.
White House: Kichline, D. W.

NEW YORK

Albany: Kievit, Basil, 333 Livingstone Ave.
Brooklyn: Anderson, J. K.,121 Prospect St.; Dashiell, Mrs. John, 181 8th Ave.
Garden City: Overton, Dr. D. E., 50 Franklin Court.
New York: Downes, Jos., 162 E. 83d St.; Farrell, Mrs. Thos. P., 164 W. 79th St.; Levy, Isaac M., 815 Madison Ave.; Moe, Henry Allen, 551 5th Ave.; Parsons, J. L., Jr., 235 E. 73rd St.; Peavy, Miss Isabella B., 235 E. 22d St.; Posner, Louis S., 1185 Park Ave.; Rogers, Mrs. Anna L., 2300 Sedgwick Ave., Bronx; Swinney, John B., 1441 Broadway; Stauffen, E., 55 Broad St.; Sutton, F. J. H., 1150 5th Ave.; Whipple, Mrs. L. R., 128 W. 11th St.; Whitney, Frank, 955 Lexington Ave.; Williams, Thomas, 6 W. 8th St.
Palisades: O'Neill, Wm., Old Meeting House.
Selkirk: Peltz, W. L. L.
White Plains: Leighton, N. C., Mamaroncek Ave.
Yonkers: Smith, H. Armour, 414 Warburton Ave.

PENNSYLVANIA

Landsdowne: Stern, Miss Edith, 126 West Baltimore Ave.
Philadelphia: Sussell, Arthur, 18th and Spruce Sts.; Yellin, Samuel, 5520 Arch St.
West Chester: Ball, Wm., 112 E. Linden St.

RHODE ISLAND

Bristol: Lawson, Mrs. John, P. O. Box 96.
Pawtucket: Lawson, Mrs. Robert H., 55 Cooke St.
Providence: Kingman, Eugene A., 15 Westminster St.

VERMONT

Newbury: Darling, Richard F.

VIRGINIA

Mount Vernon: Wall, Charles C.,care Mount Vernon Ladies Soc.
Newport News: Ferguson, Homer L., care Mariners' Museum.

WEST VIRGINIA

Fairmont: Mulligan, Mrs. Henry, Country Club Road.

Farm Implements of 1803

(*Continued from last issue*)

For finding a spring, the borer is of the same kind as that used for searching for pit coal, etc., the lower part "in the shape of a large auger, from 2½ to 3 inches in diameter." It is made in several sections which are screwed together, as the boring progresses. The part above the auger is about one inch square, "and the men have each of them an iron bar, one end of which is fitted to the square part of the borer, which serves as a handle."[106]

Dr. Darwin's drill-machine "is simply an improvement on that described in Mr. Tull's book, by enlarging that part of the axle-tree which delivers the grain into a cylinder of some inches diameter, with excavations in the rim; which rim rises above the surface of the corn in the seed-box, and lets drop again into the seed-box whatever grains fill the holes above the level of the rim, as that side of the cylinder ascends." Ducker's drill-machine "is a kind of plough having ten small shares, 9 inches apart; these cut as many drills, and the seed is sown broadcast (but not quite so much seed as in the common method) over these furrows; and a light pair of harrows, which work upon a kind of hinges in the middle, follows in the same direction as the drills, levels the surface, strikes the seed into the furrows, and covers it with the greatest accuracy." Mure's machine "is a drill plough, with two mould-boards at once going, forms the ridge with the dung in the centre of it, makes a drill, sows the seed, and covers it."[107]

Tools for grafting: "a neat small hand saw, to cut off the heads of large stocks,a good strong knife with a thick back, to make clefts in the stocks, a sharp penknife to cut the grafts, a grafting chisel and a small mallet."[135]

Various types of hand-hoes are the Dutch hoe, the narrow hoe or spud, the common hoe, which had a blade anywhere from less than three inches to over a foot in breadth, Ducket's hoe, and the Portugese hoe, which had "a short, light handle, and the iron-work heavy, and of a conical form."[156]

"Hook and hinks" or "hook and swipe" is "a method of cutting peas with two reap hooks; that in the right hand cuts them; and that in the left, draws them together in bundles."[158] For sowing beet seed, "a short roller has been invented with wooden pins or pegs to dib the holes."[199]

"Mole-hills or ant-hills are removed by chopping round them with a heavy adze or grubbing hoe (the cutting edge of which is circular, and 10½ inches wide; the depth of the blade, including its neck to the eye, or where the handle is fastened, is 8½ inches) or "with a plough — see the plate, fig. 10. — the beam 9 feet long and 4 inches square; the two flat shares of iron 4 feet long and 5 inches wide; the side pieces 5 feet long and 5 inches broad, by 4 thick; the handles 4 feet 6 inches long; the four standards 2 feet high from the ground, same size as beam."[214]

Ploughs without wheels are "suited to stony, uneven soils where the wheel ploughs cannot act"; the *turn-wrist* plough is "adapted to hilly or banky land, the mould board turning so as to suffer the plough to make good work on its return, and still lay the furrow down the hill"; the advantage of one or two wheels is that "they keep the share at a uniform depth"; ploughs sometimes have two shares,—the first "skims the turf, and lays it in the bottom of the former furrow; and the other brings up fresh mould, in order to cover the turf"; the plough with double mould-board is "used for earthing plants and forming drains."[254]

Three kinds of scoops for cutting out the eyes from potatoes, — "one resembles the half of a bullet-mould, another a cheese knife, and a third has a short curved blade, the last is reckoned the best (see plate, fig. 15).

(*Continued in next issue*)

The first American *geography* was Jedediah Morse's "Geography Made Easy," which was published in 1784. It was printed at New Haven, Conn., by Meigs, Bowen and Dana.

COMMUNICATIONS

From MR. FRANK WHITNEY:

"*Re* the article on horn lantern panes in the last issue, I have ascertained that these are no longer obtainable from Francis Bannerman's Sons. They tell me that the stock they listed in their catalogue was a supply of old horn which they happened to pick up, and that it was quickly sold out. Horn panes are, however, still made in England, and can be purchased through Thomas B. Adams, Inc., 63 West 46th St., New York. The standard size is three by six inches, and costs $1.00 per pane, but they can be specially ordered in other sizes."

Mr. Henry W. Erving's communication in our last issue bestirred us to look up some references on the subject of pattens, which indicate that they were in use,—in England, at least,—much later than is generally supposed. James Wylde's *Book of Trades* (London, 1866) states that they have "*gone out of fashion*", (presumably among *fashionable* people), and Edward Knight's Dictionary (1874) says that "the English and French of the wealthier class use *clogs*; the more humble class in England use *pattens*; in France, *sabots*."

"Copper is the basis of several metals for mechanic uses; as brass, *prince's metal*, bell metal, bath metal, white copper. * * * Prince's metal is made by melting zinc in substance with copper; and all the yellow compound metals prepared in imitation of gold are no other than mixtures of copper with different proportions of that semimetal, taken either in its pure state, or in its natural ore calamine, with an addition sometimes of iron filings. Zinc itself unites most easily with copper; but calamine makes the most ductile compound, and gives the most yellow colour. Dr. Lewis observes, that a little of the calamine renders the copper pale; that the yellowness increases more and more, till the proportion comes to almost one half; that on further augmenting the calamine, the compound becomes paler and paler, and at last white." — *Encyclopedia Brittanica*, 3rd Ed., 1797.

Mr. Howard G. Hubbard, to whom we are indebted for the foregoing, states that, in the early 1800's "prince's" (sometimes "princess") metal lamps, candlesticks and branches were extensively advertised, and raises the question whether some of the "brass" candlesticks of that period are not actually of prince's metal.

"POINTS" OF INTEREST

The invention of the kaleidoscope is commonly attributed to Dr. David Brewster, who obtained a patent for it about 1815, but, according to Rivington's *Book of English Trades* (1827), "the discovery is not a new one; for that a person named Bradley, a gardener at Hampton Court, mentions such an instrument in a work published by him more than one hundred years ago." Rivington, under the heading "The Optician," gives a full set of directions for constructing one.

For japanning old tea-trays, the *Scientific American* of September 3, 1864, makes the following recommendation: "First clean them thoroughly with soap and water and a little rotten stone; then dry them by wiping and exposure at the fire. Now, get some good copal varnish, mix it with some bronze powder, and apply with a brush to the denuded parts. After which, set the tea-tray in an oven at a heat of 212 or 300 degrees until the varnish is dry. Two coats will make it equal to new." — H. G. H.

It seems unbelievable that anyone should complain of the brilliancy of an oil lamp, but we are told that there were many complaints and warnings of the danger to the eyes from the then new Argand lamps, which came into common use — for those who could afford them — about 1800. This fact itself rests on hearsay evidence, but there is concrete proof that the same danger was supposed to exist as late as 1870. This proof consists of silk shades, about eight inches square, hung, like the mainsail of a square-rigged ship, from a mast-like wooden shaft with a round base. These were placed on the table so as to shade the reader's eyes, but not his book, from the intolerable (?) glare of the new kerosene lamps. The blue glass craze of the same period was partly due to the same cause. The principal factor was, however, a belief that blue light had certain vague, health-giving properties. This accounts for the light blue glass lamp chimneys which are occasionally found in antique shops.

— L. L. T.

The first mention of lamps, definitely described as such, to be found in ancient literature, is in Herodotus, who wrote about 450 B.C. (He is speaking of an Egyptian festival, but Egypt was then dominated by Greek culture.) "At the time when they gather together at the city of Sais for their sacrifices, on a certain night they all kindle lamps, many in number, about the houses in the open air. Now these lamps are saucers, full of salt and oil mixed, and the wick floats by itself on the oil and burns through the whole night. The name given to this festival is that of The Lighting of Lamps. Moreover, those of the Egyptians who have not come to this solemn assembly, nevertheless observe the night of the festival and themselves light lamps, all of them. Thus not only in Sais, but all over Egypt, lamps are lighted on this night."

— L. L. T.

The shoe horn inherits its name from the time when it was whittled from a lengthwise segment of a cow's horn, the natural curve of which was just right for the purpose.

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